## REMARKS

Claims 6 and 12 have been amended and claims 7 and 13 cancelled. Claims 6 and 8 through 12 and 14 through 17 remain in the application. Re-examination and reconsideration of the application as amended are requested.

Claims 6 to 17 on file at the time of the Office Action stand rejected under 35 USC 103(a) as being unpatentable over U.S. Patent 5.958,505 to Mantl. Reconsideration of this rejection in light of the aforementioned amendments and the following discussion is respectfully requested.

As set out in paragraph 2142 of the MPEP, to establish a prima facie case of obviousness three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine referenced teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Applicant's disclosure.

In the present case the Examiner is relying on a single reference under 35 USC 103(a) which necessitates that any difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would be obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains.

It is respectfully requested that the prior art relied on by the Examiner fails to meet this test.

The present invention relates to methods of producing a waveguide photodetector. The Examiner has found both the term waveguide and the term photodetector in the prior art and has concluded that an oblique mention of a waveguide in one context and mention of a photodetector in a totally different context is the same as a waveguide detector. Such a conclusion is false. In the present invention the waveguide detector is produced through a series of processing steps wherein a metal is deposited on a silicon based material layer and then the combination is heated so as to induce a metal-silicon reaction to produce a metallic silicide in which the silicon based material layer is consumed and converted to the silicide. By creating two such silicide regions on opposite sides of the silicon based layer there is produced configuration comprising a silicon based waveguide having silicide junctions on either side, the silicide interfaces providing mirrors and the silicide providing electrodes. The side walls extend from the surface of the silicon based material to the substrate which is an insulator.

In a second embodiment, as defined by claim 12, a ridge is formed prior to the deposition of a mask on the ridge followed by deposition of a metal. A heating cycle then results in the aforementioned metal-silicon reaction wherein the exposed silicon is consumed by the metal to form a metallic silicide.

Again the silicide on opposite sides of the ridge form mirrors and electrodes for the waveguide photodetector.

In contrast the Mantl process involves a very different series of processing steps. In Mantl a silicide layer is first deposited on the silicon based material. This is described at column 6 beginning at line 28 wherein: "On silicon substrate 1 a silicide surface layer 2 is initially deposited. This silicide layer 2 is metallic but can also be semi-conductive, preferably, however with good planarity and morphology. For best results epitactic layers with high planarity and reduced boundary surface roughness since they show elevated thermal stability." It must be understood, therefore, that in Mantl a silicide layer is epitactically grown on top of the silicon surface. Next a thin $SiO_2$ layer by for example thermal oxide is generated upon which a substantially thicker $Si_3N_4$ layer is applied.

Beginning at column 6 line 44 "there follows a thermal oxidation of the structured layer structure. The oxidation can be carried out wet or dry. When very high temperature should be avoided a wet oxidation is carried out. During the oxidation a $SiO_2$ layer is formed on the silicide 2 and the silicide layer is pressed into the silicon 1 at the locations not covered by the nitride 5. As a consequence the usual planar silicide layer 2 is deformed at the transitions between oxidized and non-oxidized region that is shown in Fig. 2c.

The silicide layer 2 however remains initially coherent and retains its planarity apart from the very small transition regions. It is thus possible to produce from a planar surface layer a silicide layer of waveshape varying in depth. With continuing oxidization, the silicide layer 2 is shoved further into the silicon and gives rise to a very special effect. At a critical oxidation depth (dependent upon the silicid, silicide layer thickness and processing) the silicide layer 2 tears precisely at the transition regions as shown in Fig. 2d. It is important here that the layer even beneath the oxide remains planar and coherent. The layer of thickness of the silicide at the oxidized region has as a result of diffusive redistribution about a 20% reduction."

This process known as LOCOSI (local oxidation of silicides) requires that there be first a silicide layer which is then exposed to an oxidation process. As described in the specification and as clearly shown in all of the drawings of the reference the silicide is either on top of the silicon as shown in Figure 2a or is driven into the silicon material first as a deformed wave shape as shown in Figure 2c and with further oxidation is driven to the point where the silicide region tears and produces a varied silicide layer as shown in Figure 2e. All of the configurations described by Mantl contain this layered structure wherein a $SiO_2$ layer appears between the top surface of the silicon material and the silicide. Because of this feature it would not be possible, using the Mantl process, to create a pair of laterally spaced silicide regions extending from the surface to the insulator substrate as defined in the present claims. The

oxidation process as described by Mantl would result in the silicide layer being forced into the silicon while creating a SiO2 layer between the surface and the silicide layer.

Based on this distinction it is clear that the Mantl reference would not provide the necessary teaching for one of ordinary skill in the art to produce the waveguide photodetector structure as defined by the claims in the present application.

The process as described in the present application is a very simple yet reliable procedure involving very few steps which are easily controlled. This results in production of reliable and inexpensive waveguide photodetectors which are not contemplated by the prior art.

It is submitted that the minor changes to the claims are merely a rewording of terminology originally on file in order to provide clarification and do not constitute new issues. For example, what was previously described as side walls wherein a wall is clearly a structure from bottom to top has now been defined as such. Furthermore, the addition of the word laterally to describe the silicide regions as being laterally separated naturally fall from the terminology previously used but is merely to make more explicit the construction of the photodetector waveguide.

Accordingly, it is respectfully requested that the claims, as amended, be reconsidered and passed to allowance. Favourable action to this end at an early date is earnestly solicited.

Respectfully submitted,

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